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patent**effect.**

CONTENT:

1. **Patent Name**

2. **Inventors (Team)**

3. **Problem/Opportunity**

4. **Your Solution and TRL**

5. **Value Proposition**

6. **Targeted Customer/User Segment**

7. **Market Size/Growth**

8. **Competitors**

9. **Development Needs and Road Map**

10. **Commercialization Model**

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PATENT NAME:

WatchBuilt

Automated Continuos Construction Progress Monitoring

WatchBuilt
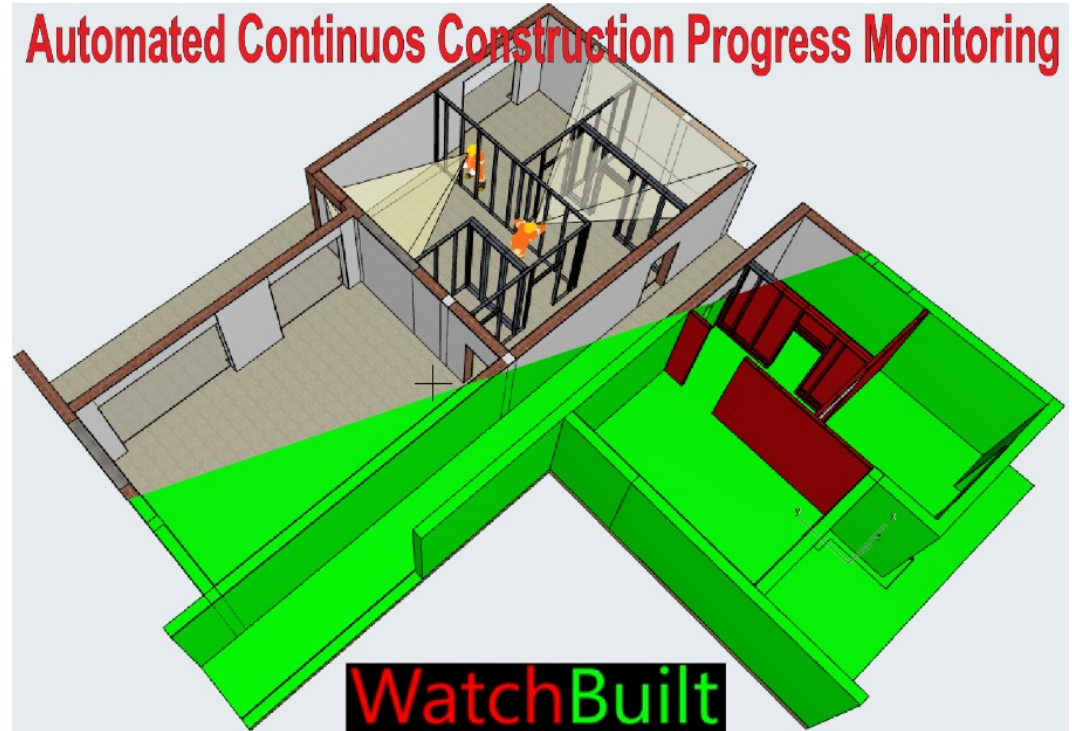
Patent Slogan:

Novel solution to complete construction projects on time.

INVENTORS (TEAM):

„We are a team of researchers and innovators with rich knowledge and experience and a vision of improving advanced solutions for the built environment"

Fakulteta za gradbeništvo, prometno inženirstvo in arhitekturo

Univerza v Mariboru

Zoran Pučko
Assistant Professor
patent innovator

Danijel Rebolj
Full Professor
patent innovator

Univerza v Mariboru

FERI
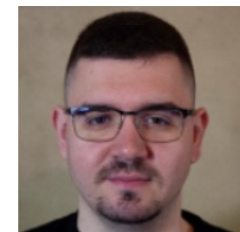Fakulteta za elektrotehniko, računalništvo in informatiko

Domen Mongus
Associate Professor

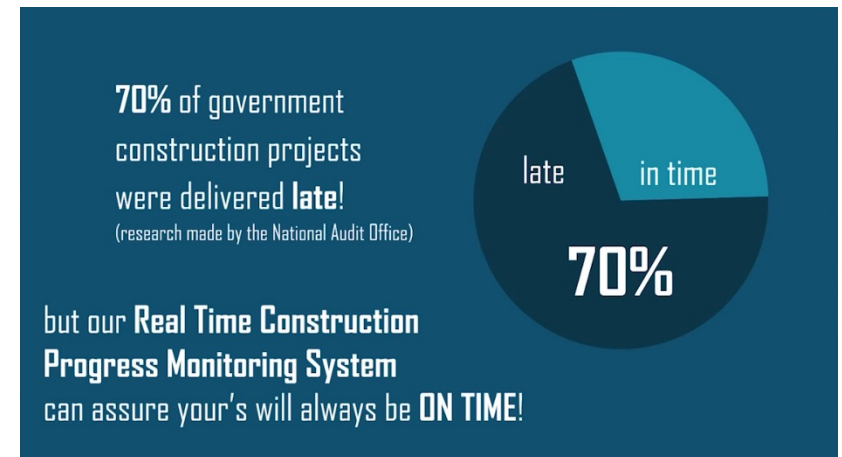**Marko Bizjak**
Teaching Assistant

Tadej Stošić
Software Engineer

PROBLEM:

- Construction progress monitoring in current practice has 5 major problems that need to be solved:
    - ❖ carried out **manually** (they are not automated)
    - ❖ represents **extensive works of experts**,
    - ❖ which are **time-consuming**,
    - ❖ **expensive** and
   - ❖ often **ineffective**.

OPPORTUNITY:

- replace manual execution and automate the process, which has the following advantages:
    - ❖ time-consuming work is done without wasting time
    - ❖ we avoid delays in the execution of individual elements of the building
    - ❖ the information is accurate and timely with a high frequency of updates
    - ❖ there is no need to hire an expert to inspect the construction site

70% of government construction projects were delivered **late**!
(research made by the National Audit Office)

late   in time

70%

but our **Real Time Construction Progress Monitoring System** can assure your's will always be **ON TIME**!

Reference: National Audit Office

The invention is a fully automated system that replaces the manual construction progress monitoring task in an autonomous manner

How it works!
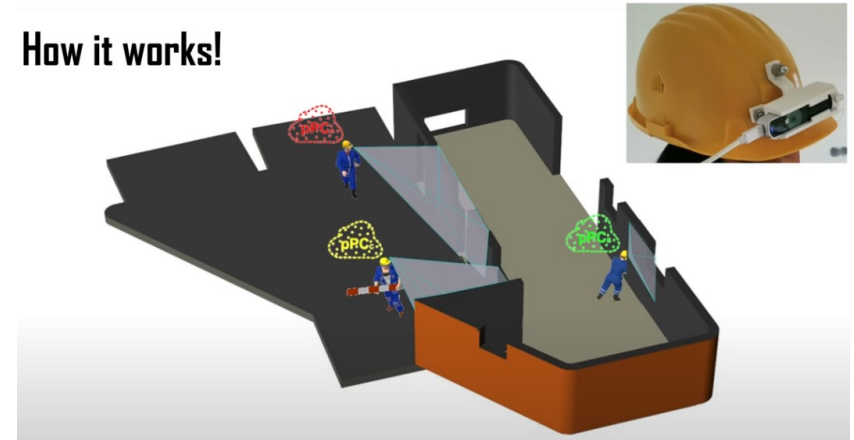
OUR SOLUTION:

- The invention enables efficient **continuous and fully automated** construction progress monitoring in real time, inside and outside the building under construction, without additional work activities and represents added value for all companies involved in the construction process, which strive to achieve the goal of completing projects on time.

  ❖ *Novelty method for Automated Continuous Construction Progress Monitoring (ACCPM)*
  ❖ *Built-in 3D scanner automatically captures the surroundings of their workplaces from the helmet.*
  ❖ *The 3D scanner generates a point cloud in which elements from the basic 3D BIM model are automatically identified.*

TECHNOLOGY READINESS LEVEL (TRL) 5

VALUE PROPOSITION:

- By using this innovative solution, you ensure a competitive advantage that has added value for your business, and with references that you have completed construction projects on time, your reputation also grows.

Easy to use for all types of construction projects

No preparatory work and no experts needed

100% automated

More accurate

Faster and cheaper monitoring

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TARGETED CUSTOMER/USER SEGMENT:

- (SAM) **Construction contractors** (design-build contractor) with BIM approach

<p style="text-align:center;color:red;">**OR**</p>
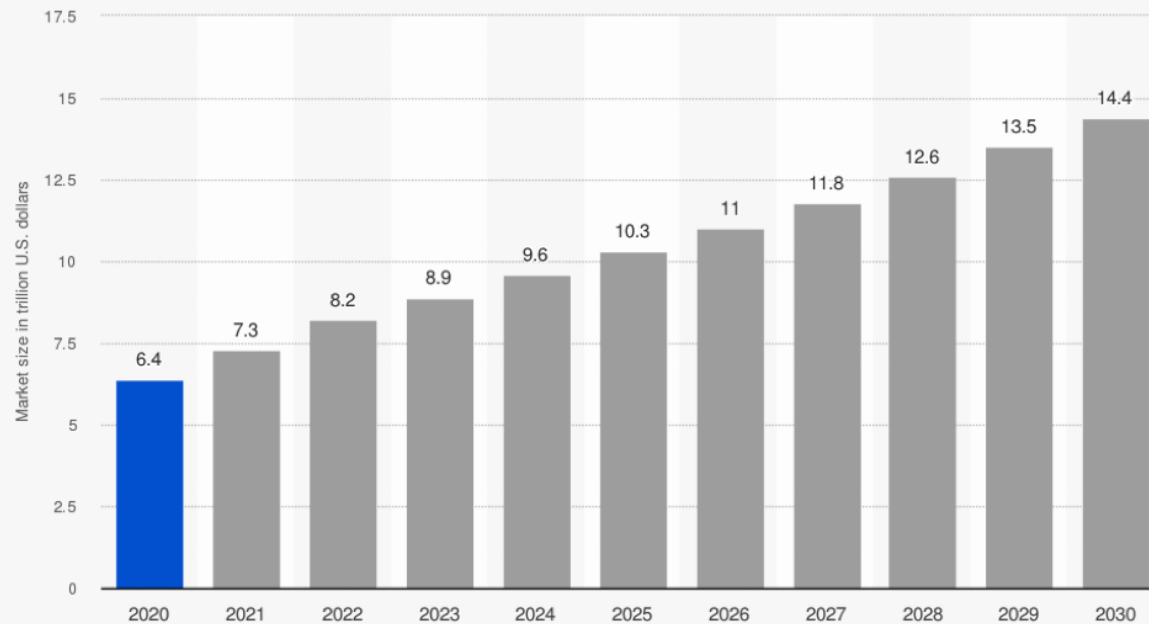
- (SAM) **Developers of construction software** based on the BIM approach

<p style="text-align:center;color:red;">**OR**</p>

- (SAM) **Smart helmet developers** for Construction companies which includes the BIM approach

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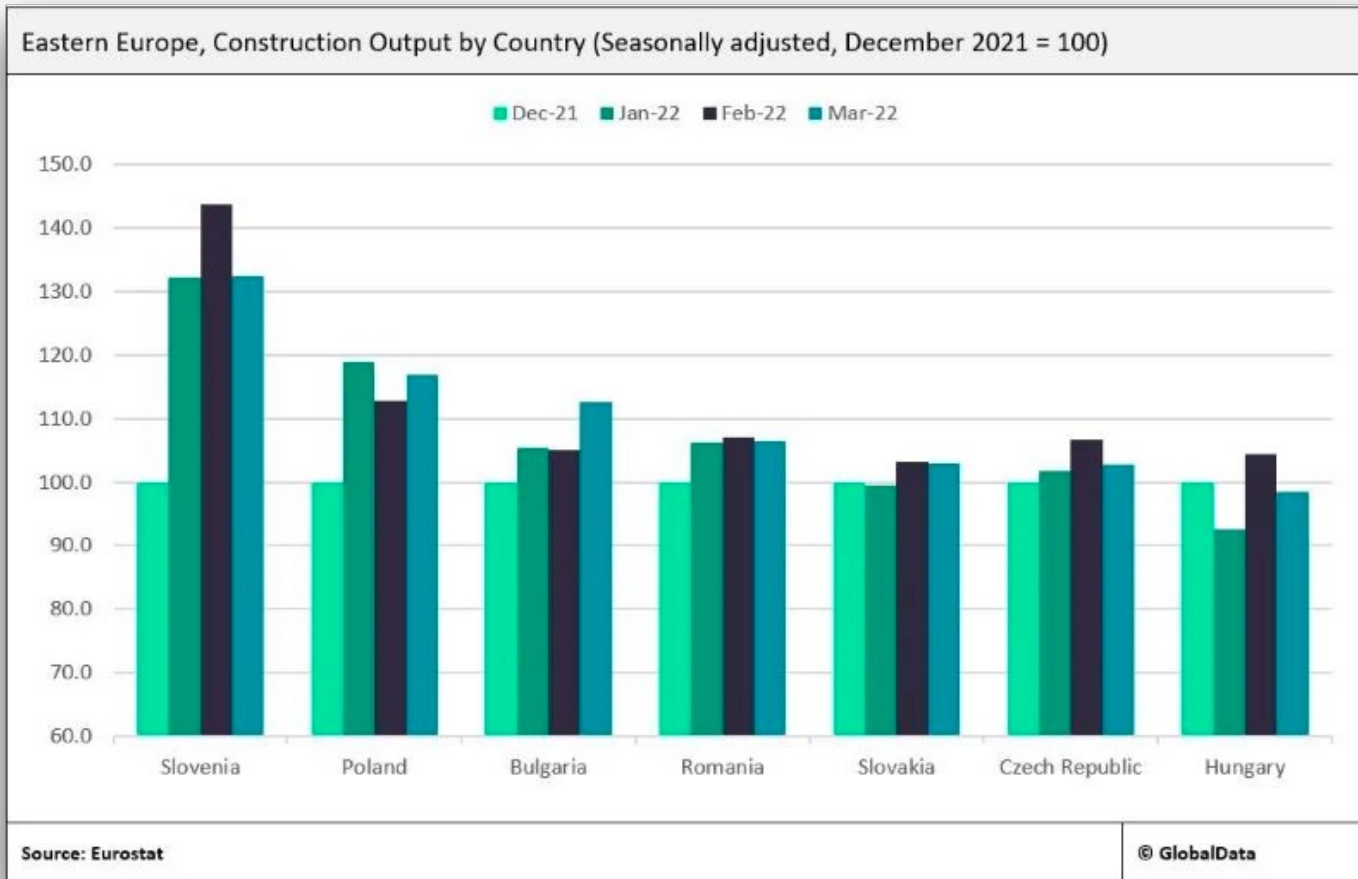
MARKET SIZE/GROWTH:

Size of the global construction market in 2020, with forecasts from 2021 to 2030 (in trillion U.S. dollars)

Source
Next Move Strategy Consulting
© Statista 2022

Additional Information:
Worldwide; 2020

MARKET SIZE/GROWTH:

Eastern Europe, Construction Output by Country (Seasonally adjusted, December 2021 = 100)

Source: Eurostat

© GlobalData

MARKET SIZE/GROWTH:

TABLE 01. GLOBAL IOT IN CONSTRUCTION MARKET, BY APPLICATION, 2019-2027 ($ MILLION)

APPLICATION	2019	2020	2021	2022	2023	2024	2025	2026	2027	CAGR% 2020–2027
Asset monitoring	2,507.6	2,340.4	2,765.7	3,231.3	3,732.2	4,260.9	4,807.6	5,360.3	5,905.0	14.2%
Predictive maintenance	980.7	933.2	1,123.9	1,337.6	1,573.1	1,828.0	2,098.7	2,380.1	2,665.9	16.2%
Fleet management	1,959.6	1,810.0	2,116.4	2,446.5	2,795.6	3,157.1	3,523.4	3,885.2	4,232.5	12.9%
Wearables	519.0	509.6	632.0	773.0	932.7	1,110.1	1,303.6	1,510.2	1,726.0	19.1%
Others	2,212.9	2,030.3	2,357.9	2,706.8	3,070.9	3,442.9	3,813.6	4,173.1	4,510.5	12.1%
Total	8,179.9	7,623.6	8,995.9	10,495.2	12,104.4	13,799.1	15,547.0	17,308.9	19,039.8	14.0%

Source: AMR Analysis

MARKET SIZE/GROWTH:

4.2.3.   Market analysis, by country

FIGURE 12.   COMPARATIVE SHARE ANALYSIS OF IOT IN CONSTRUCTION MARKET REVENUE FOR ASSET MONITORING, BY COUNTRY, 2019 & 2027 (%)
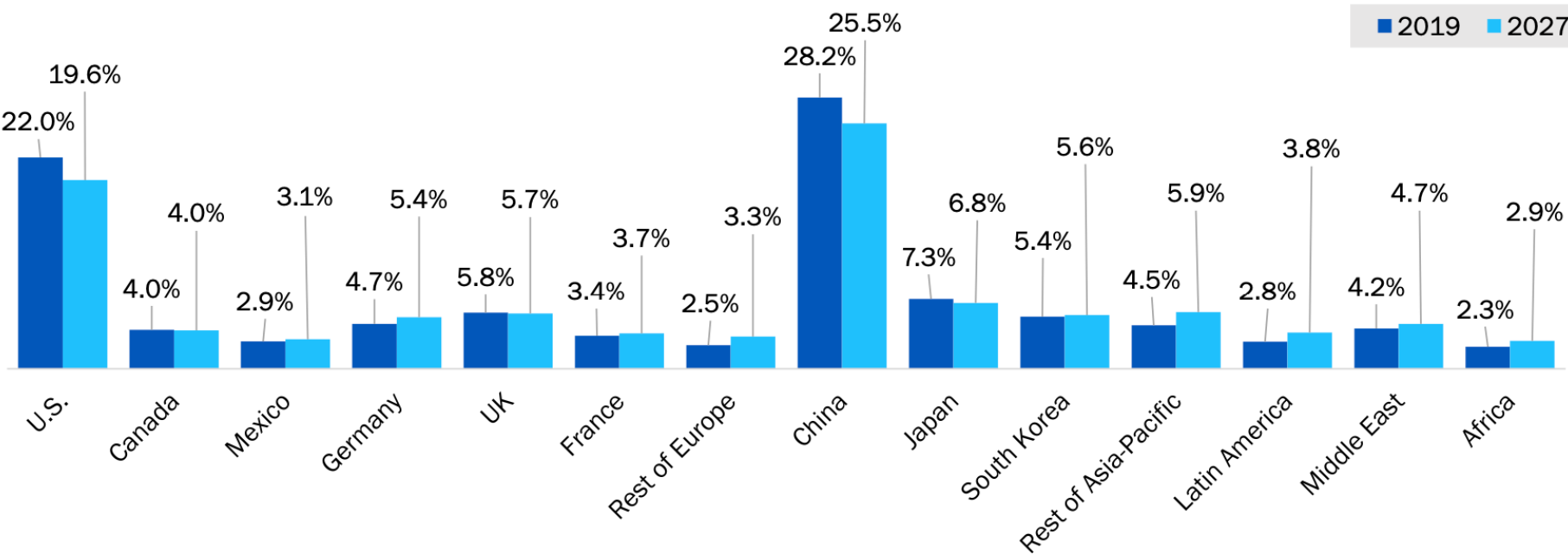
Source: AMR Analysis

COMPETITORS:

- There is **no complete solution** on the market that would be directly applicable in construction practice. There are individual technologies (laser scanning, photogrammetry) that are used experimentally in practical cases and not all processes are automated or a lot of manual work (post-processing) is required.

Scan vs. BIM method	Trait - degree of automation					Trait - usability on the construction site		Trait - the cost of use	Trait - preparatory work	Trait - time required for postprocessing	Sum	Ranking
	Data capture	Identification of elements	Generating As-built models	Comparison of As-design vs As-built	Validation of results	Inside	Outside					
Laser scanning	3	1	1	2	1	1	2	1	1	1	14	🥉
Photogrammetry	3	2	1	2	1	1	2	2	1	2	17	🥈
ACCPM (RGB-D)	3	3	3	3	3	2	2	3	2	3	27	🥇

Scoring legend:

3 - automatically	2 - without obstacles	3 - low	2 - no	3 - nothing
2 - semi-automatic	1 - limited	2 - acceptable	1 - yes	2 - acceptable
1 - manually		1 - high		1 - a lot

DEVELOPMENT NEEDS/ROAD MAP:

Finding partners/funders for R&D - Currently TRL 5

May 2022 - September 2022

Final testing of the prototype and the entire system - TRL 9

May 2023 - December 2023

Further development of the prototype (elimination of current shortcomings - program code problem) **- TRL 7**

October 2022 - April 2023

Product Launch
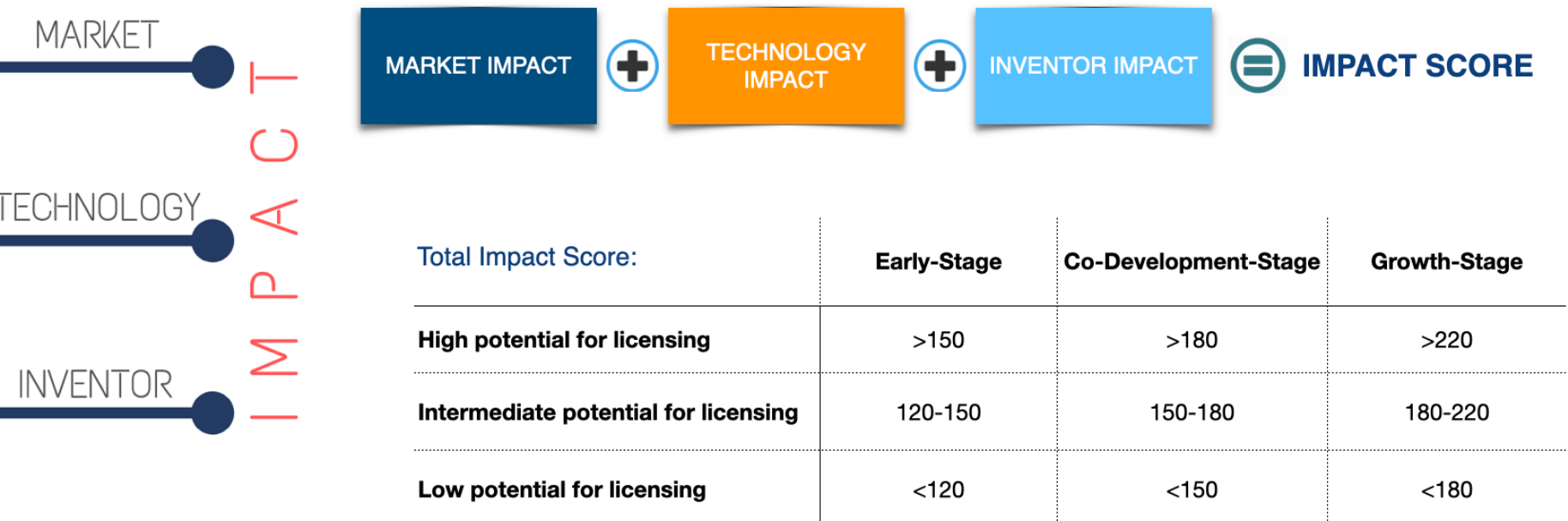
The first quarter of the year 2024

COMMERCIALIZATION MODEL

- Patent Licensing

  - *Exclusive/non-exclusive*

- Patent Assignment

- Co-development to increase TRL

- Partnership for test/analysis

PATENT SCORE:

We used patent scoring matrix to understand the the power of invention in terms of market attractiveness, technology potential and team profiles. These 3 main criteria has different sub-dimensions that can be scored according to the stage of the technology (Explore, Validate and Launch).

MARKET

TECHNOLOGY

INVENTOR

I M P A C T

MARKET IMPACT + TECHNOLOGY IMPACT + INVENTOR IMPACT = **IMPACT SCORE**

Total Impact Score:	Early-Stage	Co-Development-Stage	Growth-Stage
High potential for licensing	>150	>180	>220
Intermediate potential for licensing	120-150	150-180	180-220
Low potential for licensing	<120	<150	<180

PATENT SCORE:

VALIDATE Phase	
MARKET	83
TECHNOLOGY	58
TEAM	65
PATENT SCORE	205
PATENT SCORE %	84%

PATENT SCORE

Investment Level	EXPLORE Phase	VALIDATE Phase	LAUNCH Phase
High Potential	>150	>180	>220
Medium Potential	120-150	150-180	180-220
Low Potential	<120	<150	<180

PATENT SCORE %

Investment Level	EXPLORE Phase	VALIDATE Phase	LAUNCH Phase
High Potential	>%60	>%70	>%85
Medium Potential	%45-60	%60-70	%70-85
Low Potential	<%45	<%60	<%70

High Potential for Licensing